CLAIMS

1. A method to identify an image orientation, the method comprising:

extracting features from a periphery of an image;

evaluating the features based on training image feature orientation classification models; and

responsive to evaluating the features, identifying an orientation of the image.

2. A method as recited in claim 1, wherein the features comprise chrominance and luminance features.

3. A method as recited in claim 1, wherein evaluating the features further comprises:

evaluating the orientation to determine a level of confidence in the orientation; and

determining that the orientation based on the level of confidence.

4. A method as recited in claim 1, wherein evaluating the low-level features further comprises generating, by a plurality of classifiers, the training image feature orientation classification models using a plurality of training images.

5. A method as recited in claim 1, wherein evaluating the low-level features further comprises generating, by a plurality of support vector machines, the training image feature orientation classification models using a plurality of training images.

6. A method as recited in claim 1, wherein the features comprise color moment and structural features, and wherein evaluating the features further comprises:

classifying, by a first plurality of classifiers, orientations of the color moment features with respect to each of a plurality of orientations to generate respective color moment confidence values for each orientation;

evaluating, by the first classifiers, orientations of the structural features with respect to each orientation to generate respective structural confidence values for each orientation;

for each orientation, combining, by a second plurality of classifiers, the color moment and structural confidence values that correspond to the orientation to generate a respective image orientation confidence value that corresponds to the orientation; and

wherein the orientation is based on the respective image orientation confidence values.

7. A method as recited in claim 6, wherein the color moment and structural confidence values are combined with a static classifier.

8. A method as recited in claim 6, wherein the color moment and structural confidence values are combined with a hierarchically trainable classifier.

9. A computer-readable medium comprising computer-executable instructions to identify an image orientation, the computer-executable instructions comprising instructions for:

extracting features from a periphery of an image;

evaluating the features based on training image feature orientation classification models; and

responsive to evaluating the features, identifying an orientation of the image.

10. A computer-readable medium as recited in claim 9, wherein the features comprise chrominance and luminance features.

11. A computer-readable medium as recited in claim 9, wherein the instructions for evaluating the low-level features further comprise instructions for:

evaluating the orientation to determine a level of confidence in the orientation; and

determining that the orientation is correct or incorrect based on the level of confidence.

12. A computer-readable medium as recited in claim 9, wherein the instructions for evaluating the low-level features further comprise instructions for:

generating, by a plurality of classifiers, the training image feature orientation classification models using a plurality of training images.

13. A computer-readable medium as recited in claim 9, wherein the features comprise color moment and structural features, and wherein the instructions for evaluating the low-level features further comprise instructions for:

classifying, by a first plurality of classifiers, orientations of the color moment features with respect to each of a plurality of orientations to generate respective color moment confidence values for each orientation;

evaluating, by the first classifiers, orientations of the structural features with respect to each orientation to generate respective structural confidence values for each orientation;

for each orientation, combining, by a second plurality of classifiers, the color moment and structural confidence values that correspond to the orientation to generate a respective image orientation confidence value that corresponds to the orientation; and

wherein the orientation is based on the respective image orientation confidence values.

14. A computer-readable medium as recited in claim 9, wherein the features comprise color moment and structural features, and wherein the instructions for evaluating the low-level features further comprise instructions for:

classifying, by a first plurality of support vector machines, orientations of the color moment features with respect to each of a plurality of orientations to generate respective color moment confidence values for each orientation;

evaluating, by the first support vector machines, orientations of the structural features with respect to each orientation to generate respective structural confidence values for each orientation;

for each orientation, combining, by a second plurality of support vector machines, the color moment and structural confidence values that correspond to the orientation to generate a respective image orientation confidence value that corresponds to the orientation; and

wherein the orientation is based on the respective image orientation confidence values.

15. A computer-readable medium as recited in claim 13, wherein combining the color moment and structural confidence values the color moment and structural confidence values further comprises combining the color moment and structural confidence values with a static classifier.

16. A computer-readable medium as recited in claim 13, wherein combining the color moment and structural confidence values the color moment and structural confidence values further comprises combining the color moment and structural confidence values with a hierarchically trainable classifier.

17. A device to identify an image orientation, the device comprising:

a processor;

a memory coupled to the processor, the memory comprising computer-executable instructions, the processor being configured to fetch and execute the computer-executable instructions for:

extracting features from a periphery of an image;

evaluating the features based on training image feature orientation classification models; and

responsive to evaluating the features, identifying an orientation of the image.

18. A device as recited in claim 17, wherein the features comprise chrominance and luminance features.

19. A device as recited in claim 17, wherein the instructions for evaluating the features further comprise instructions for:

evaluating the orientation to determine a level of confidence in the orientation; and

determining that the orientation is correct or incorrect based on the level of confidence.

20. A device as recited in claim 17, wherein the instructions for evaluating the low-level features further comprise instructions for generating, by a plurality of classifiers, the training image feature orientation classification models using a plurality of training images.

21. A device as recited in claim 17, wherein the instructions for evaluating the low-level features further comprise instructions for generating, by a plurality of support vector machines, the training image feature orientation classification models using a plurality of training images.

22. A device as recited in claim 17, wherein the features comprise color moment and structural features, and wherein the instructions for evaluating the low-level features further comprise instructions for:

classifying, by a first plurality of classifiers, orientations of the color moment features with respect to each of a plurality of orientations to generate respective color moment confidence values for each orientation;

evaluating, by the first classifiers, orientations of the structural features with respect to each orientation to generate respective structural confidence values for each orientation;

for each orientation, combining, by a second plurality of classifiers, the color moment and structural confidence values that correspond to the orientation to generate a respective image orientation confidence value that corresponds to the orientation; and

wherein the orientation is based on the respective image orientation confidence values.

23. A device as recited in claim 22, wherein combining the color moment and structural confidence values the color moment and structural confidence values further comprises combining the color moment and structural confidence values with a static classifier.

24. A device as recited in claim 22, wherein combining the color moment and structural confidence values the color moment and structural confidence values further comprises combining the color moment and structural confidence values with a hierarchically trainable classifier.

25. A device to identify an image orientation, the device comprising processing means for:

extracting features from a periphery of an image;

evaluating the features based on training image feature orientation classification models; and

responsive to evaluating the features, identifying an orientation of the image.

26. A device as recited in claim 25, wherein the features comprise chrominance and luminance features.

27. A device as recited in claim 25, wherein the means for evaluating the features further comprise means for:

evaluating the orientation to determine a level of confidence in the orientation; and

determining that the orientation is correct or incorrect based on the level of confidence.

28. A device as recited in claim 25, wherein the means for evaluating the low-level features further comprise means for generating the training image feature orientation classification models using a plurality of training images.

29. A device as recited in claim 25, wherein the features comprise color moment and structural features, and wherein the means for evaluating the low-level features further comprise means for:

classifying orientations of the color moment features with respect to each of a plurality of orientations to generate respective color moment confidence values for each orientation;

evaluating orientations of the structural features with respect to each orientation to generate respective structural confidence values for each orientation;

for each orientation, combining the color moment and structural confidence values that correspond to the orientation to generate a respective image orientation confidence value that corresponds to the orientation; and

wherein the orientation is based on the respective image orientation confidence values.

30. A device as recited in claim 29, wherein the means for combining the color moment and structural confidence values the color moment and structural confidence values further comprises means for combining the color moment and structural confidence values with a static classifier.

31. A device as recited in claim 29, wherein the means for combining the color moment and structural confidence values the color moment and structural confidence values further comprises means for combining the color moment and structural confidence values with a hierarchically trainable classifier.

32. A method to identify a correct image orientation, the method comprising:

dividing an image into a plurality of blocks comprising peripheral blocks and non-peripheral blocks;

extracting low-level content from the peripheral blocks, the content comprising chrominance and luminance features;

classifying orientations of the chrominance features with respect to each of a plurality of orientations to generate respective chrominance confidence values for each orientation;

evaluating orientations of the luminance features with respect to each orientation to generate respective luminance confidence values for each orientation;

for each orientation, combining the chrominance and luminance confidence values that correspond to the orientation to generate a respective image orientation confidence value that corresponds to the orientation; and

identifying the correct image orientation based on the respective image orientation confidence values.

33. A method as recited in claim 32, wherein the chrominance features comprise color moments and wherein the luminance features comprise structural features.

34. A method as recited in claim 32, wherein classifying orientations of the chrominance features, evaluating orientations of the luminance features, and combining the chrominance and luminance confidence values are performed using statistical analysis learning techniques.